

CLAIMS

What is claimed is:

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1. In a client computer system, a method for defining objects, the method comprising the steps of:

providing a local object specification to a server;

receiving a global object specification from the server, the global object specification including at least one global object definition having a unique global object identification; and

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generating a signal indicating whether the global object specification and the local object specification define common object definitions.

2. The method of claim 1 wherein the step of providing the local object specification to the server includes the steps of:

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reserving an object creation right with the server;

in response to reserving the object creation right with the server, defining the local object specification to include at least one local object definition and a corresponding local object identification that is unique to the at least one local object on the client; and transferring the local object specification to the server.

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3. The method of claim 2 wherein the step of reserving an object creation right with the server includes the step of:

checking for an existence of an object specification on the server, and if no object specification exists on the server, creating a reservation object specification on the server in order to reserve the object creation right with the server on behalf of the client, and if an object specification exists on the server, receiving a denial of the object creation right for the client.

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4. The method of claim 1 wherein the step of generating a signal indicating whether the global object specification and the local object specification define common object definitions includes the steps of:

checking whether the global object specification contains a corresponding global object definition for each respective local object defined in the local object specification; and

if the global object specification contains a corresponding global object definition for each respective local object defined in the local object specification, then replacing the local object specification in the client with the global object specification received from the server; and

if the global object specification does not contain a corresponding global object definition for each respective local object defined in the local object specification, then providing the indication of an error to the server.

5. The method of claim 1 wherein the signal indicates that the global object specification and the local object specification define common object definitions and wherein the method further comprising the steps of:

in response to the signal indicating that the global object specification and the local object specification define common object definitions, providing a confirmation of acceptance of the global object specification to the server to indicate to the server to send an update to other clients such that the other clients can create objects in conjunction with the server; and

releasing the object creation right with the server.

6. The method of claim 5 wherein the step of releasing the object creation right with the server comprises the step of providing an indication to the server to delete a reservation object specification on the server that reserve the object creation right with the server on behalf of the client.

7. The method of claim 1 wherein the step of receiving the global object specification receives a global object specification containing global object definitions that correspond to respective local object definitions in the local object specification, the global object definitions having respective global object identifications that are unique amongst all global object definitions created by the server.

8. The method of claim 7 wherein:

the client is client collaboration software performing on a client computer system involved in a collaboration session with the server;

the server is collaboration adapter software operating on a collaboration computer system; and

wherein the method further comprises the step of:

in response to determining that the server properly created the global object specification, providing confirmation of acceptance of the global object specification to the server such that the server can update the global object specification of other client computer systems performing client collaboration software such that all clients involved in the collaboration session with the server contain the global object definitions having unique global object identifications.

9. In a server computer system, a method for defining objects, the method comprising the steps of:

receiving a local object specification from a client;

for each local object definition in the local object specification, defining, within a global object specification, a corresponding global object definition including a unique global object identification; and

providing the global object specification to the client.

10. The method of claim 9 wherein the step of defining, within a global object specification, a corresponding global object definition including a unique global object identification comprises the steps of:

creating a global object definition that contains object properties equivalent to object properties of the local object definition to which the global object definition corresponds;

5 generating an object identification for the unique global object identification that is unique amongst all global object identifications assigned to any existing global object definitions known to the server; and

assigning the unique global object identification to the global object definition such that the global object definition is uniquely identified amongst all global object definitions.

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11. The method of claim 10 wherein the step of creating a global object definition that contains object properties equivalent to object properties of the local object definition to which the global object definition corresponds comprises the step of:

15 copying the local object definition in the local object specification to a global object definition within the global object specification to generate the global object definition which is a copy of the local object definition; and

wherein the step of assigning the unique global object identification to the global object definition replaces the local object identification copied to the global object definition with the unique global object identification generated by the step of generating
20 an object identification for the unique global object identification.

12. The method of claim 9 further including the step of:

associating the global object definition to the global object specification.

25 13. The method of claim 9 further comprising the steps of:

receiving, from a client, a request to reserve an object creation right on the server;
and

checking if the client is able to create an object on the server, and if the client is able to create an object on the server, returning an object creation right to the client, and

if the client is not able to create an object on the server, providing a denial of the object creation right to the client.

14. The method of claim 13 wherein the step of receiving, from a client, a request to
5 reserve an object creation right on the server comprises the steps of:

receiving an attempt to create a reservation object specification from the client in
order to reserve the object creation right with the server on behalf of the client; and

wherein, if the step of checking if the client is able to create an object on the
server determines that the client is able to create an object in the server, the method

10 further includes the step of:

creating a reservation object specification on the server in order to reserve the
object creation right with the server on behalf of the client.

15. The method of claim 13 further comprising the steps of:

15 in response to returning the object creation right to the client, receiving, from a
client, a reservation object specification on the server that reserves the object creation
right on behalf of the client; and

creating the reservation object specification on the server in order to reserve the
object creation right with the server on behalf of the client.

16. The method of claim 9 further comprising the steps of:

receiving a confirmation of acceptance of the global object specification provided
to the client; and

providing a global object specification update to other clients such that the other
25 clients can retrieve the global object specification from the server.

17. The method of claim 16 further comprising the steps of:

receiving a request from the other clients for the global object specification; and

in response to receiving the request from the other clients for the global object
30 specification, providing the global object specification to the other clients.

18. A method for defining shared objects on a client and a server, the method comprising the steps of:

providing, from the client, a local object specification to the server;
 5 receiving, in the server, the local object specification from the client;
 in the server, for each local object definition in the local object specification,
 defining, within a global object specification, a corresponding global object definition
 including a unique global object identification;
 providing, from the server, the global object specification to the client.
 10 receiving, at the client, the global object specification from the server; and
 comparing, in the client, the global object specification to the local object
 specification to determine that the server properly created the global object specification
 based upon the local object specification, and if the server properly created the global
 object specification, replacing the local object specification in the client with the global
 15 object specification received from the server, and if the server improperly created a
 global object specification, providing from the client an indication of an error to the
 server.

19. A client computer system comprising:

20 an interface;
 a processor;
 a memory system; and
 an interconnection mechanism coupling the interface, the processor and the
 memory system;
 25 wherein the memory system is encoded with an client object manager process
 that, when performed on the processor, operates as a client to cause the client computer
 system to define shared objects by performing the operations of:
 providing a local object specification defined in the memory system to a server
 via the interface;

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receiving, in the memory system, a global object specification from the server via the interface; and

generating a signal in the memory system indicating whether the global object specification and the local object specification define common object definitions having
5 respective unique object identifiers.

20. The client computer system of claim 19 wherein when the processor performs the operation of providing the local object specification to the server, the processor further performs the operations of:

10 reserving an object creation right with the server; and

in response to reserving the object creation right with the server, defining a local object specification in the memory system to include at least one local object definition and a corresponding local object identification that is unique to the at least one local object on the client; and

15 transferring the local object specification to the server via the interface.

21. The client computer system of claim 20 wherein when the processor performs the operation of reserving an object creation right with the server, the processor further performs the operations of:

20 checking for an existence of an object specification on the server, and if no object specification exists on the server, creating a reservation object specification on the server in order to reserve the object creation right with the server on behalf of the client, and if an object specification exists on the server, receiving, via the interface, a denial of the object creation right for the client.

25 22. The client computer system of claim 20 wherein when the processor performs the operation of generating a signal indicating whether the global object specification and the local object specification define common object definitions, the processor further performs the operations of:

checking whether the global object specification contains a corresponding global object definition for each respective local object defined in the local object specification;

if the global object specification contains a corresponding global object definition for each respective local object defined in the local object specification, then replacing the local object specification in the memory system in the client with the global object specification received from the server; and

if the global object specification does not contain a corresponding global object definition for each respective local object defined in the local object specification, then providing the indication of an error to the server via the interface.

23. The client computer system of claim 19 wherein the signal indicates that the global object specification and the local object specification define common object definitions and wherein the processor further performs the operations of:

in response to the signal indicating that the global object specification and the local object specification define common object definitions, providing a confirmation of acceptance of the global object specification to the server, via the interface, to indicate to the server to send an update to other clients such that the other clients can create objects in conjunction with the server; and

releasing the object creation right with the server.

24. The client computer system of claim 23 wherein when the processor performs the operation of releasing the object creation right with the server, the processor performs the operation of providing an indication to the server, via the interface, to delete a reservation object specification on the server that reserve the object creation right with the server on behalf of the client.

25. The client computer system of claim 19 wherein when the processor performs the operation of receiving the global object specification the processor performs the operation of:

receiving, via the interface, a global object specification containing global object definitions that correspond to respective local object definitions in the local object specification, the global object definitions having respective global object identifications that are unique amongst all global object definitions created by the server.

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26. The client computer system of claim 25 wherein:

the client is client collaboration software performing on a client computer system involved in a collaboration session with the server;

the server is collaboration adapter software operating on a collaboration computer system; and

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wherein the processor further performs the operation of:

in response to determining that the server properly created the global object specification, providing confirmation of acceptance of the global object specification to the server via the interface such that the server can update the global object specification of other client computer systems performing client collaboration software such that all clients involved in the collaboration session with the server contain the global object definitions having unique global object identifications.

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27. A server computer system comprising:

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an interface;

a processor;

a memory system; and

an interconnection mechanism coupling the interface, the processor and the memory system;

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wherein the memory system is encoded with a server object manager process that, when performed on the processor, operates as a server to cause the server computer system to define objects by performing the operations of:

receiving a local object specification from a client via the interface;

for each local object definition in the local object specification, defining, within a global object specification in the memory system, a corresponding global object definition including a unique global object identification; and

providing the global object specification from the memory system to the client via the interface.

28. The server computer system of claim 27 wherein when the processor performs the operation of defining, within a global object specification, a corresponding global object definition including a unique global object identification the processor performs the operations of:

creating a global object definition in the memory system that contains object properties equivalent to object properties of the local object definition to which the global object definition corresponds; and

generating an object identification for the unique global object identification that is unique amongst all global object identifications assigned to any existing global object definitions known to the server; and

assigning the unique global object identification to the global object definition in the memory system such that the global object definition is uniquely identified amongst all global object definitions in the memory system.

29. The server computer system of claim 28 wherein when the processor performs the operation of creating a global object definition that contains object properties equivalent to object properties of the local object definition to which the global object definition corresponds the processor performs the operations of:

copying the local object definition in the local object specification to a global object definition within the global object specification to generate the global object definition which is a copy of the local object definition; and

wherein the step of assigning the unique global object identification to the global object definition replaces the local object identification copied to the global object

definition with the unique global object identification generated by the step of generating an object identification for the unique global object identification.

30. The server computer system of claim 29 wherein the processor further performs the operation of:

associating the global object definition to the global object specification.

31. The server computer system of claim 27 wherein the processor further performs the operations of:

receiving, from a client, a request to reserve an object creation right on the server; and

checking if the client is able to create an object on the server, and if the client is able to create an object on the server, returning an object creation right to the client, and if the client is not able to create an object on the server, providing a denial of the object creation right to the client.

32. The server computer system of claim 31 wherein when the processor performs the operation of receiving, from a client, a request to reserve an object creation right on the server, the processor performs the operations of:

receiving, via the interface, an attempt to create a reservation object specification from the client in order to reserve the object creation right with the server on behalf of the client; and

wherein, if the step of checking if the client is able to create an object on the server determines that the client is able to create an object in the server, the method further includes the step of:

creating a reservation object specification on the server in order to reserve the object creation right with the server on behalf of the client.

33. The server computer system of claim 31 wherein the processor further performs the operations of:

in response to returning the object creation right to the client, receiving, from a client via the interface, a reservation object specification on the server that reserves the object creation right on behalf of the client; and

creating the reservation object specification in the memory system on the server in order to reserve the object creation right with the server on behalf of the client.

34. The server computer system of claim 27 wherein the processor further performs the operations of:

receiving, via the interface from the client, a confirmation of acceptance of the global object specification provided to the client; and

providing a global object specification update, via the interface to other clients such that the other clients can retrieve the global object specification from the server.

35. The server computer system of claim 26 wherein the processor further performs the operations of:

receiving, via the interface, a request from the other clients for the global object specification in the memory system; and

in response to receiving the request from the other clients for the global object specification, providing the global object specification in the memory system to the other clients via the interface.

36. The server computer system of claim 27 wherein the server computer system is a collaboration server and wherein the server object manager process encoded in the memory system is server collaboration software that, when performed on the processor, operates as a collaboration server to allow distribution of the global object specification to multiple client computer systems involved in a collaboration session.

37. A system for defining objects on a client and a server, the system comprising the steps of:

a client computer system configured with a client;

a server computer system configured with a server;
a network interconnecting the client computer system and the server computer system;
the client providing a local object specification to the server via the network;
5 the server receiving the local object specification from the client via the network;
for each local object definition in the local object specification, the server defining, within a global object specification, a corresponding global object definition including a unique global object identification;
the server providing the global object specification to the client via the network;
10 the client receiving the global object specification from the server; and
the client comparing the global object specification to the local object specification to determine whether the server properly created the global object specification based upon the local object specification by determining whether the global object specification and the local object specification define common object definitions,
15 and if the server properly created the global object specification, replacing the local object specification in the client with the global object specification received from the server, and if the server improperly created a global object specification, providing from the client an indication of an error to the server.

20 38. A computer program product having a computer-readable medium including computer program logic encoded thereon for defining objects in a client, such that the computer program logic, when performed on at least one processor within a client computer system, causes the at least one processor to perform the operations of:
providing a local object specification to a server;
25 receiving a global object specification from the server; and
generating a signal indicating whether the global object specification and the local object specification define common object definitions having respective unique object identifiers.

39. A computer program product having a computer-readable medium including computer program logic encoded thereon for defining objects in a server, such that the computer program logic, when performed on at least one processor within a server computer system, causes the at least one processor to perform the operations of:

5 receiving a local object specification from a client;

for each local object definition in the local object specification, defining, within a global object specification, a corresponding global object definition including a unique global object identification; and

providing the global object specification to the client.

10 40. The computer program product of claim 39 wherein the computer program logic that causes the at least one processor to perform the operation of defining, within a global object specification, a corresponding global object definition including a unique global object identification, comprises computer program logic that when performed on the
15 processor, causes the at least one processor to perform the operations of:

creating a global object definition that contains object properties equivalent to object properties of the local object definition to which the global object definition corresponds;

generating an object identification for the unique global object identification that
20 is unique amongst all global object identifications assigned to any existing global object definitions known to the server; and

assigning the unique global object identification to the global object definition such that the global object definition is uniquely identified amongst all global object definitions.

25 41. In a client computer system, a method for performing object operations, the method comprising the steps of:

providing an object operation to a server from a client performing on the client computer system;

receiving, at the client, a global object specification update from the server, the global object specification update indicating that the server performed the object operation on a global object specification maintained by the server; and

in response to receiving the global object specification update, performing the object operation on a global object specification maintained by the client.

42. The method of claim of claim 41 wherein the object operation is a create object operation, and wherein the step of providing the object operation to a server comprises the steps of:

defining at least one object property for a global object definition to be created by the server;

providing the object operation to the server including the at least one object property; and

wherein the step of receiving receives the global object specification update containing a new global object identification for a new global object definition to be created in the global object specification in the client computer system; and

wherein the step of performing the object operation on a global object specification maintained by the client includes the steps of:

generating the global object definition within the global object specification on the client computer system, the global object definition containing the at least one object property and containing the global object identification received from the global object specification update.

43. The method of claim of claim 41 wherein the object operation is a delete object operation, and wherein the step of providing the object operation to a server comprises the steps of:

defining at least one object property for a global object definition to be deleted from a global object specification maintained by the server;

providing the object operation to the server including the at least one object property; and

wherein the step of performing the object operation on a global object specification maintained by the client includes the steps of:

removing a global object definition within the global object specification that corresponds to the global object identification received from the global object specification update.

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Species	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	2029-2030	2030-2031	2031-2032	2032-2033	2033-2034	2034-2035	2035-2036	2036-2037	2037-2038	2038-2039	2039-2040	2040-2041	2041-2042	2042-2043	2043-2044	2044-2045	2045-2046	2046-2047	2047-2048	2048-2049	2049-2050	2050-2051	2051-2052	2052-2053	2053-2054	2054-2055	2055-2056	2056-2057	2057-2058	2058-2059	2059-2060	2060-2061	2061-2062	2062-2063	2063-2064	2064-2065	2065-2066	2066-2067	2067-2068	2068-2069	2069-2070	2070-2071	2071-2072	2072-2073	2073-2074	2074-2075	2075-2076	2076-2077	2077-2078	2078-2079	2079-2080	2080-2081	2081-2082	2082-2083	2083-2084	2084-2085	2085-2086	2086-2087	2087-2088	2088-2089	2089-2090	2090-2091	2091-2092	2092-2093	2093-2094	2094-2095	2095-2096	2096-2097	2097-2098	2098-2099	2099-2100	2100-2101	2101-2102	2102-2103	2103-2104	2104-2105	2105-2106	2106-2107	2107-2108	2108-2109	2109-2110	2110-2111	2111-2112	2112-2113	2113-2114	2114-2115	2115-2116	2116-2117	2117-2118	2118-2119	2119-2120	2120-2121	2121-2122	2122-2123	2123-2124	2124-2125	2125-2126	2126-2127	2127-2128	2128-2129	2129-2130	2130-2131	2131-2132	2132-2133	2133-2134	2134-2135	2135-2136	2136-2137	2137-2138	2138-2139	2139-2140	2140-2141	2141-2142	2142-2143	2143-2144	2144-2145	2145-2146	2146-2147	2147-2148	2148-2149	2149-2150	2150-2151	2151-2152	2152-2153	2153-2154	2154-2155	2155-2156	2156-2157	2157-2158	2158-2159	2159-2160	2160-2161	2161-2162	2162-2163	2163-2164	2164-2165	2165-2166	2166-2167	2167-2168	2168-2169	2169-2170	2170-2171	2171-2172	2172-2173	2173-2174	2174-2175	2175-2176	2176-2177	2177-2178	2178-2179	2179-2180	2180-2181	2181-2182	2182-2183	2183-2184	2184-2185	2185-2186	2186-2187	2187-2188	2188-2189	2189-2190	2190-2191	2191-2192	2192-2193	2193-2194	2194-2195	2195-2196	2196-2197	2197-2198	2198-2199	2199-2200	2200-2201	2201-2202	2202-2203	2203-2204	2204-2205	2205-2206	2206-2207	2207-2208	2208-2209	2209-2210	2210-2211	2211-2212	2212-2213	2213-2214	2214-2215	2215-2216	2216-2217	2217-2218	2218-2219	2219-2220	2220-2221	2221-2222	2222-2223	2223-2224	2224-2225	2225-2226	2226-2227	2227-2228	2228-2229	2229-2230	2230-2231	2231-2232	2232-2233	2233-2234	2234-2235	2235-2236	2236-2237	2237-2238	2238-2239	2239-2240	2240-2241	2241-2242	2242-2243	2243-2244	2244-2245	2245-2246	2246-2247	2247-2248	2248-2249	2249-2250	2250-2251	2251-2252	2252-2253	2253-2254	2254-2255	2255-2256	2256-2257	2257-2258	2258-2259	2259-2260	2260-2261	2261-2262</
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